

THE WILSON CYCLE ORIGIN OF THE JAN MAYEN MICROPLATE

Christian Schiffer

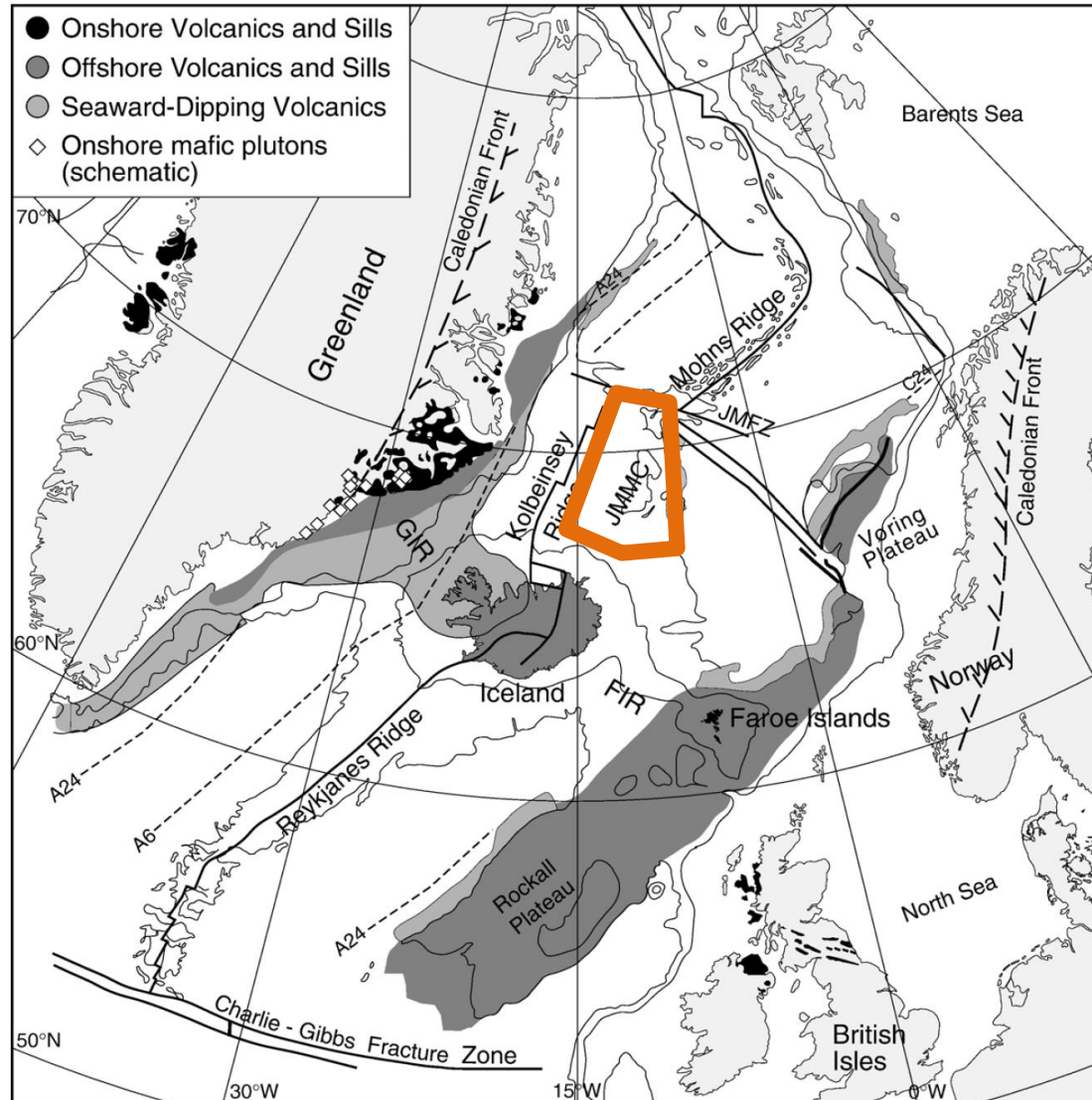
Alex Peace, Jordan Phethean, Gillian Foulger, Ken McCraffrey, Laurent Gernigon, Kenni Petersen

YGS-NEGS meeting, Durham, 28 January 2017

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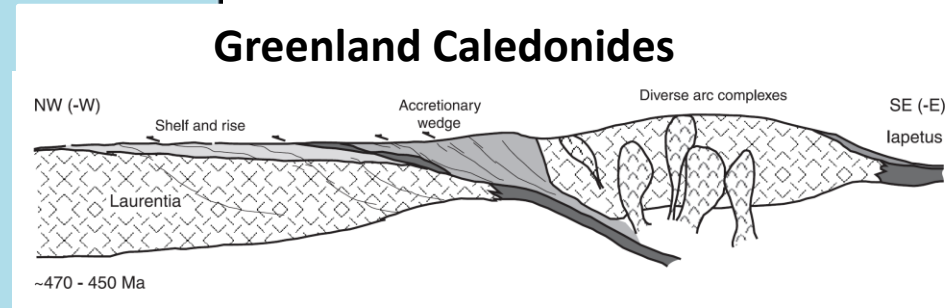
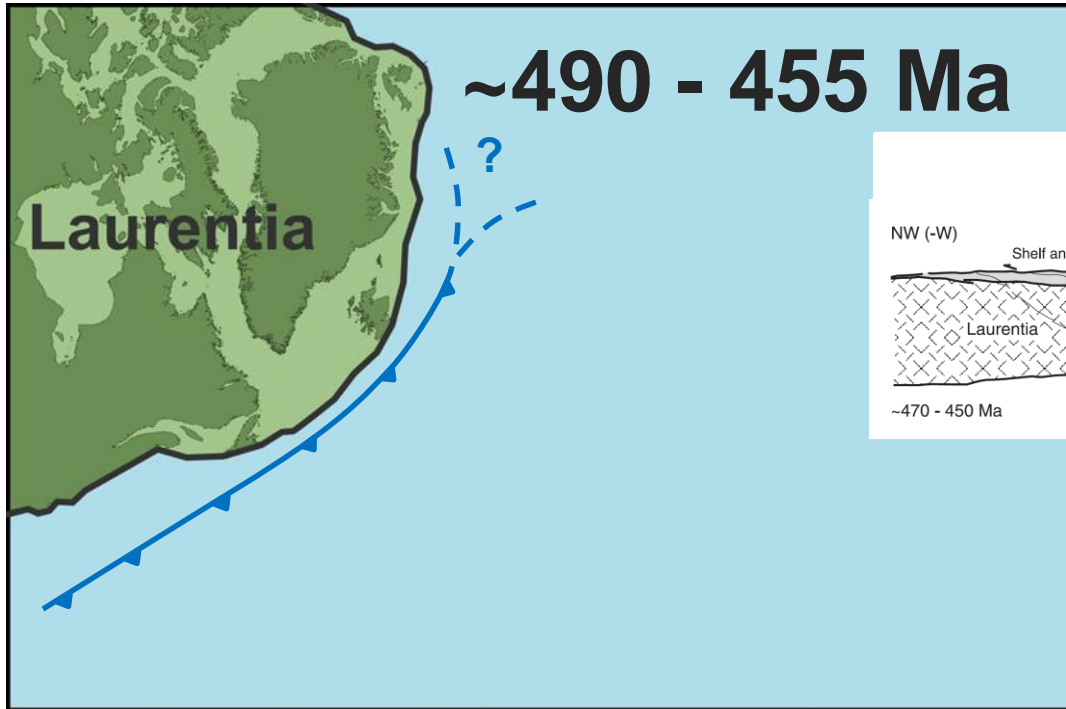


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Tegner et al. (2009)

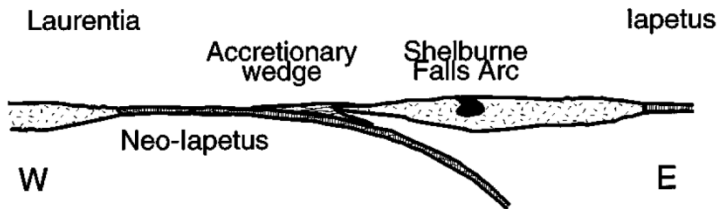
Caledonian orogeny



Roberts (2003)

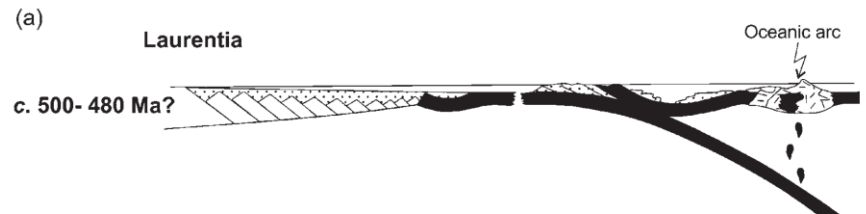
North American Caledonides (Taconian)

A. Early Ordovician



Karabinos et al. (1998)

British-Irish Caledonides (Grampian)

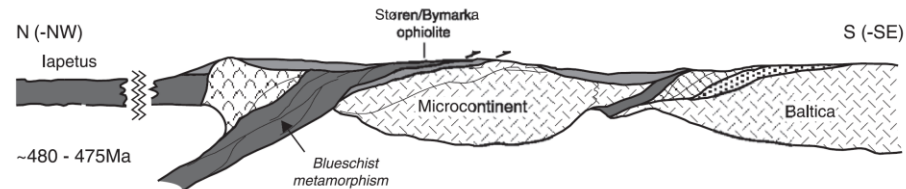


Bird (2013)

Caledonian orogeny



Greenland Caledonides

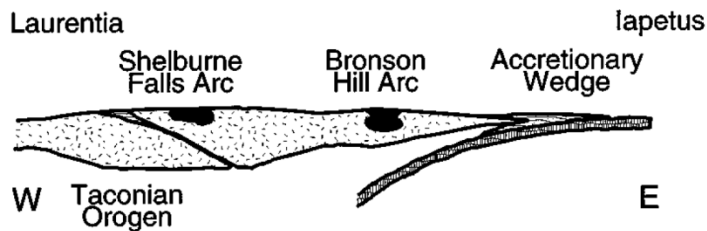


Gee (2005)

British-Irish Caledonides

North American Caledonides

B. Late Ordovician



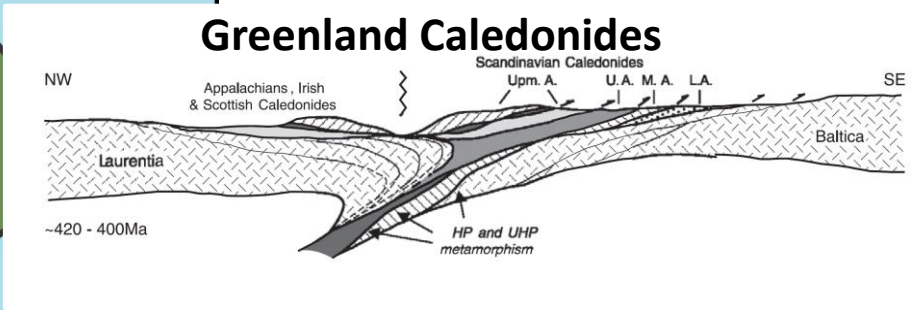
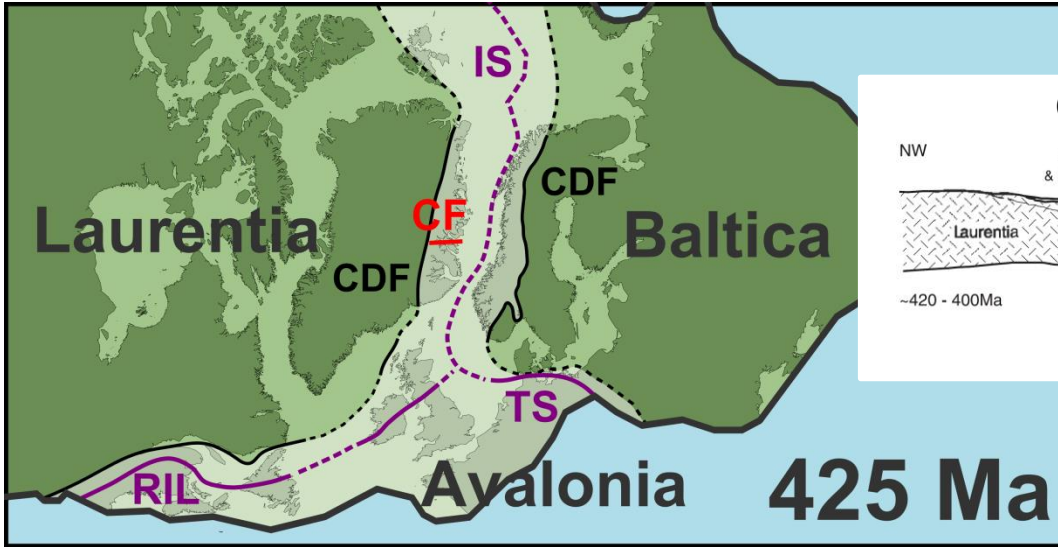
Karabinos et al. (1998)

(c)
c. 450 Ma



Bird (2013)

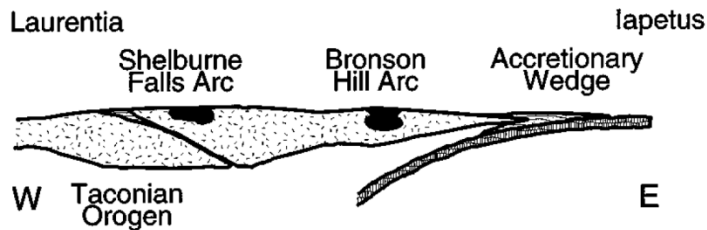
Caledonian orogeny



Gee (2005)

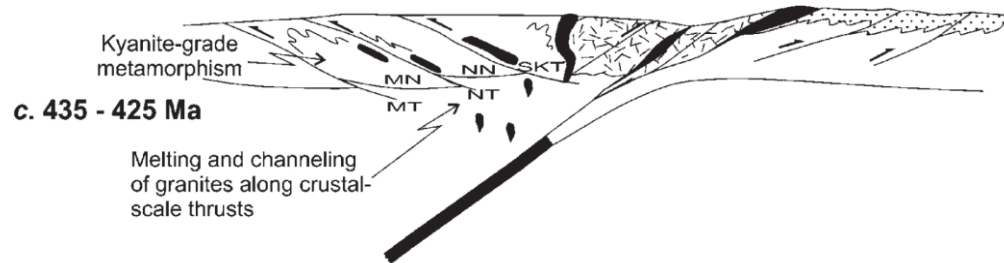
North American Caledonides

B. Late Ordovician



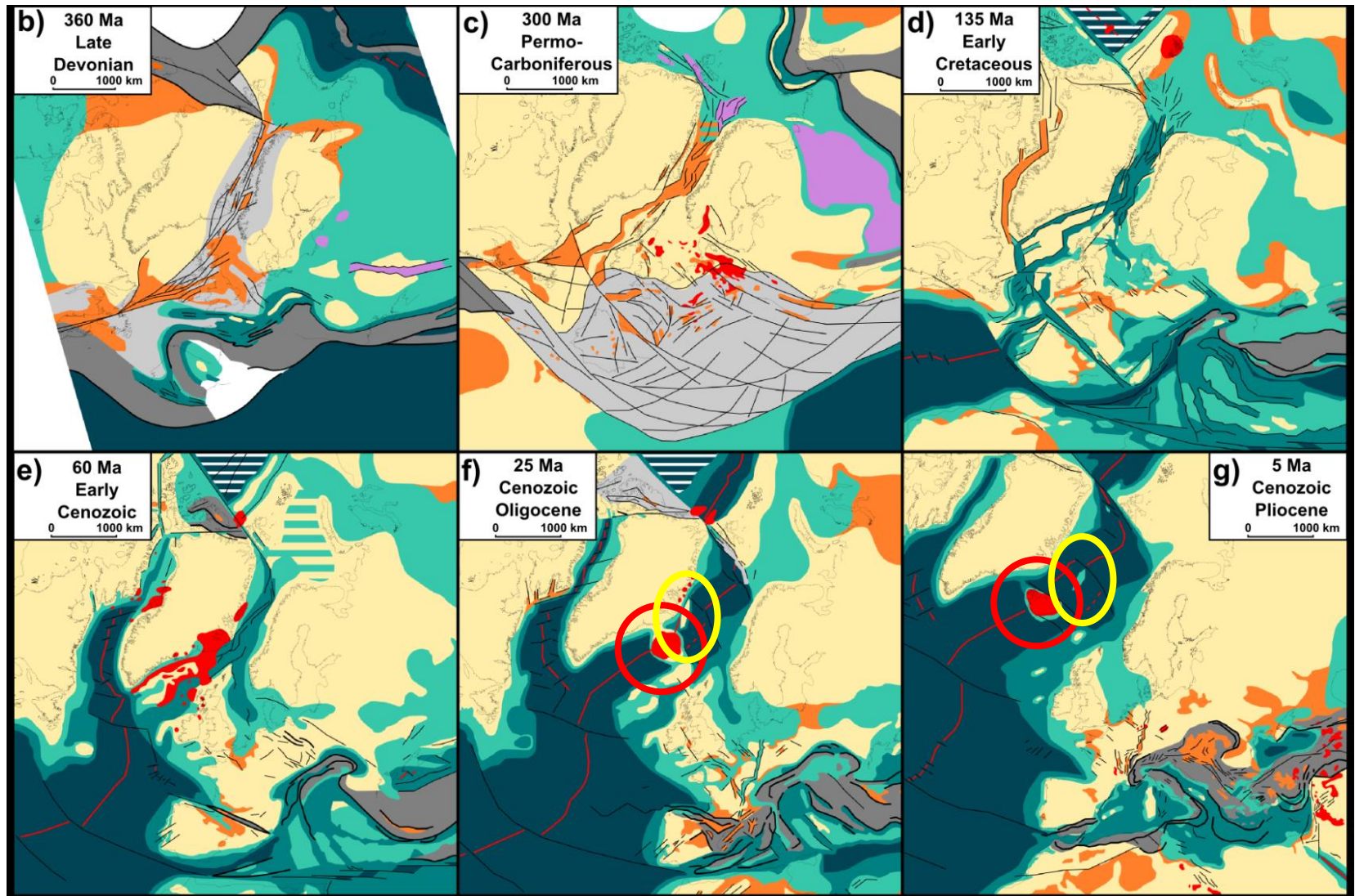
Karabinos et al. (1998)

British-Irish Caledonides



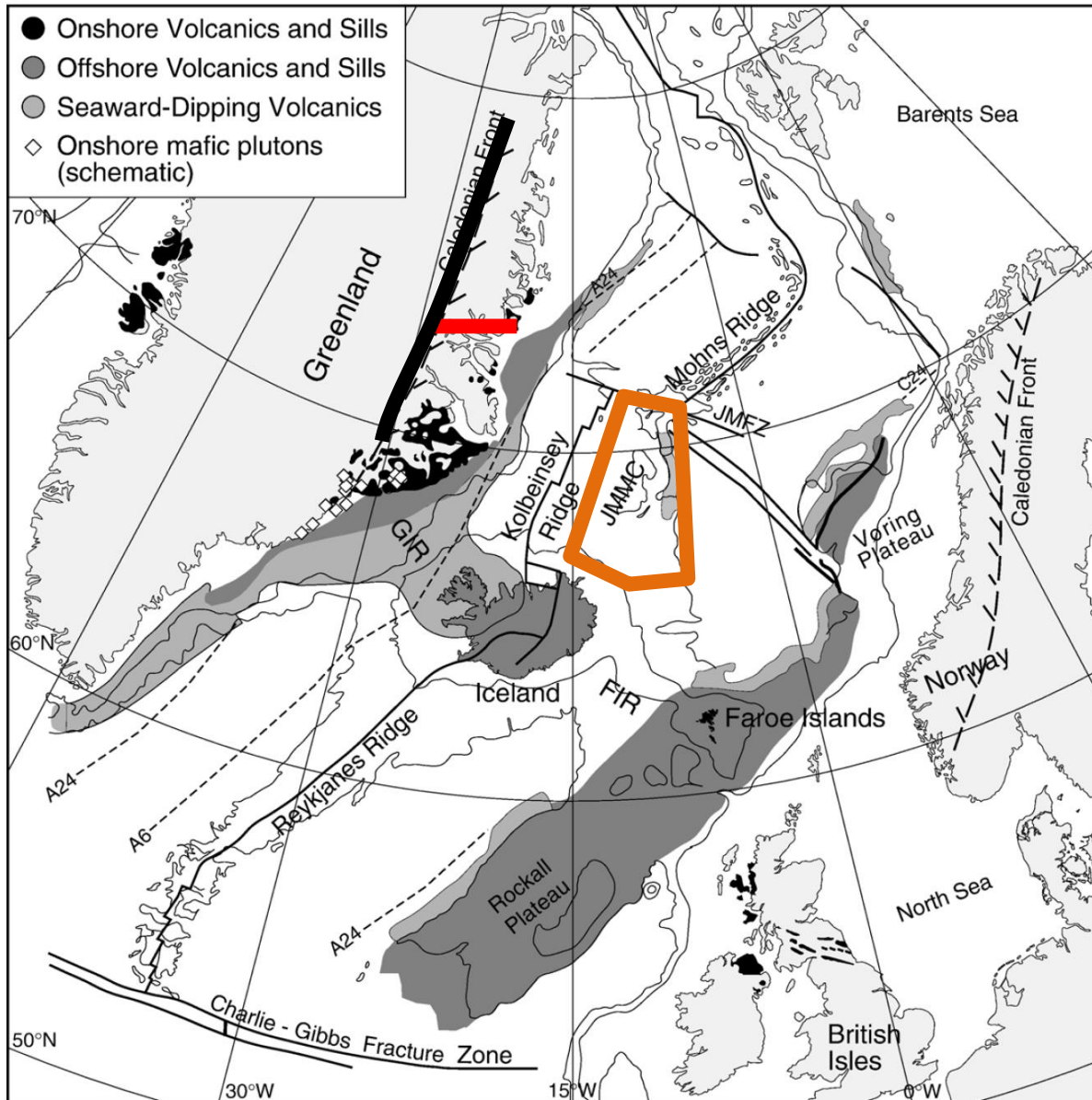
Bird (2013)

Post-Caledonian evolution

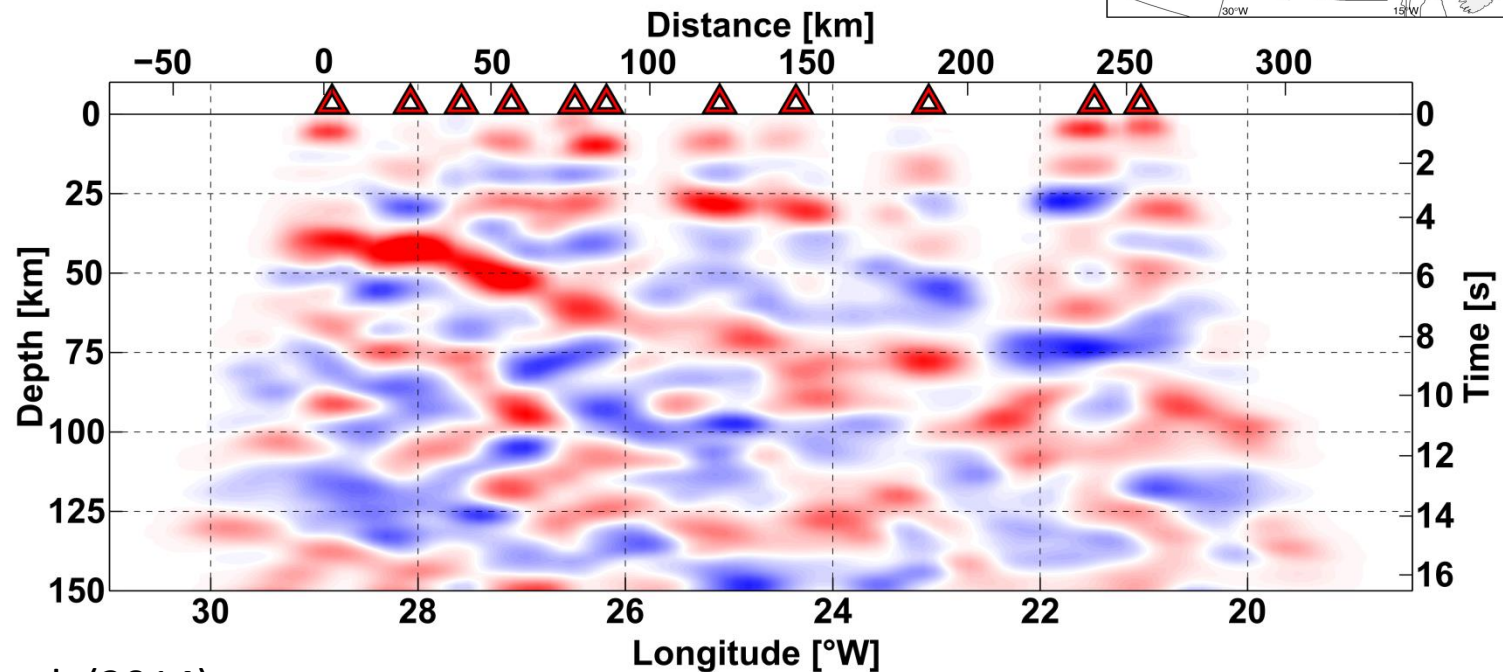
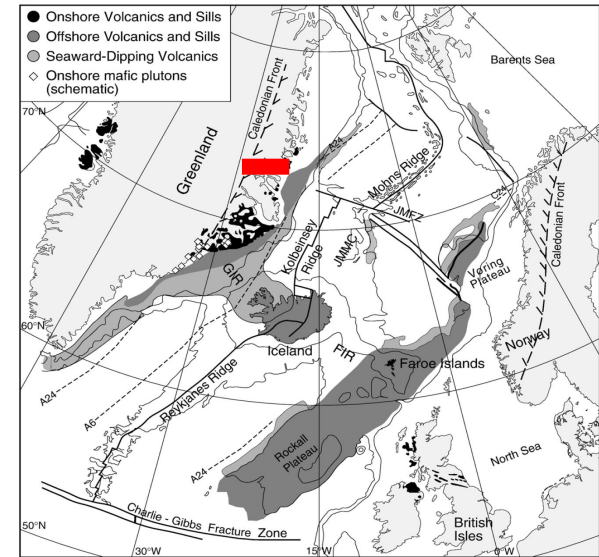


after Ziegler (1988)

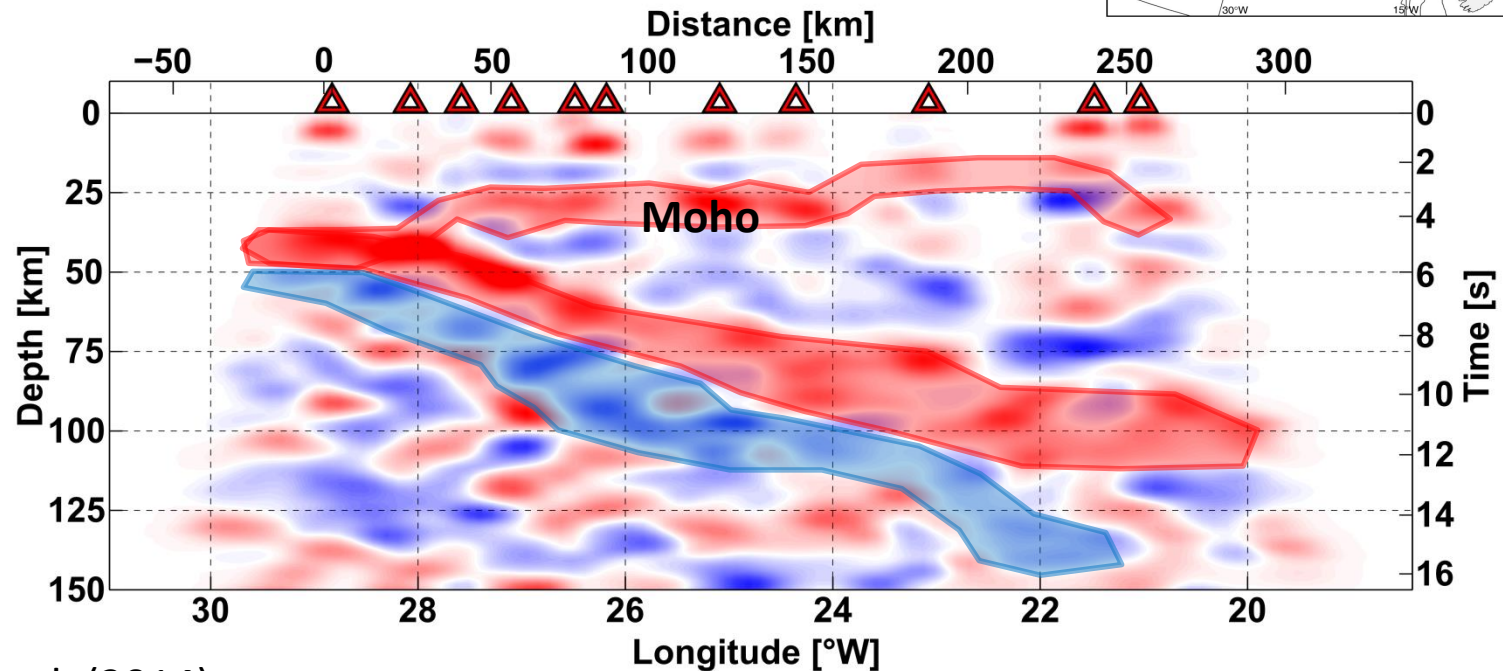
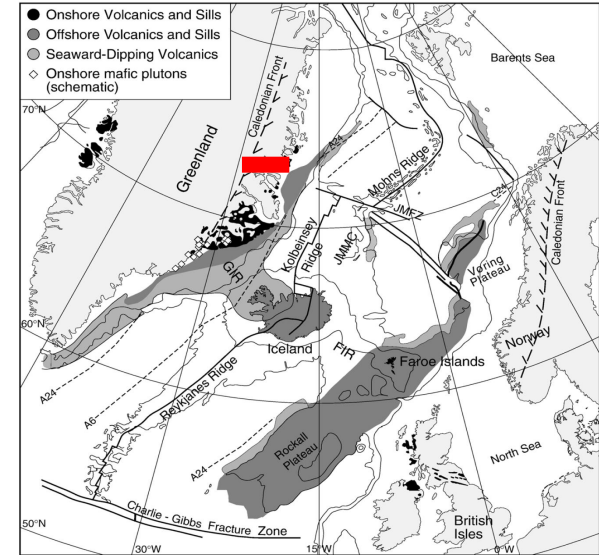
East Greenland



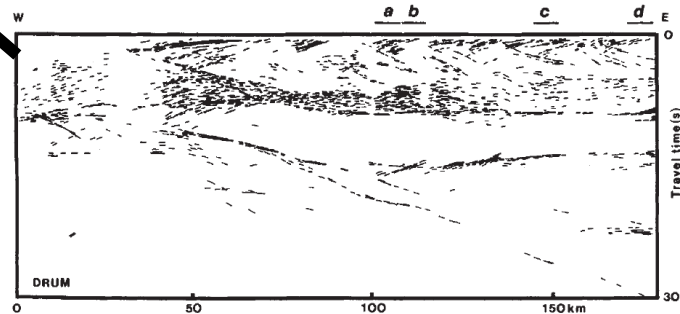
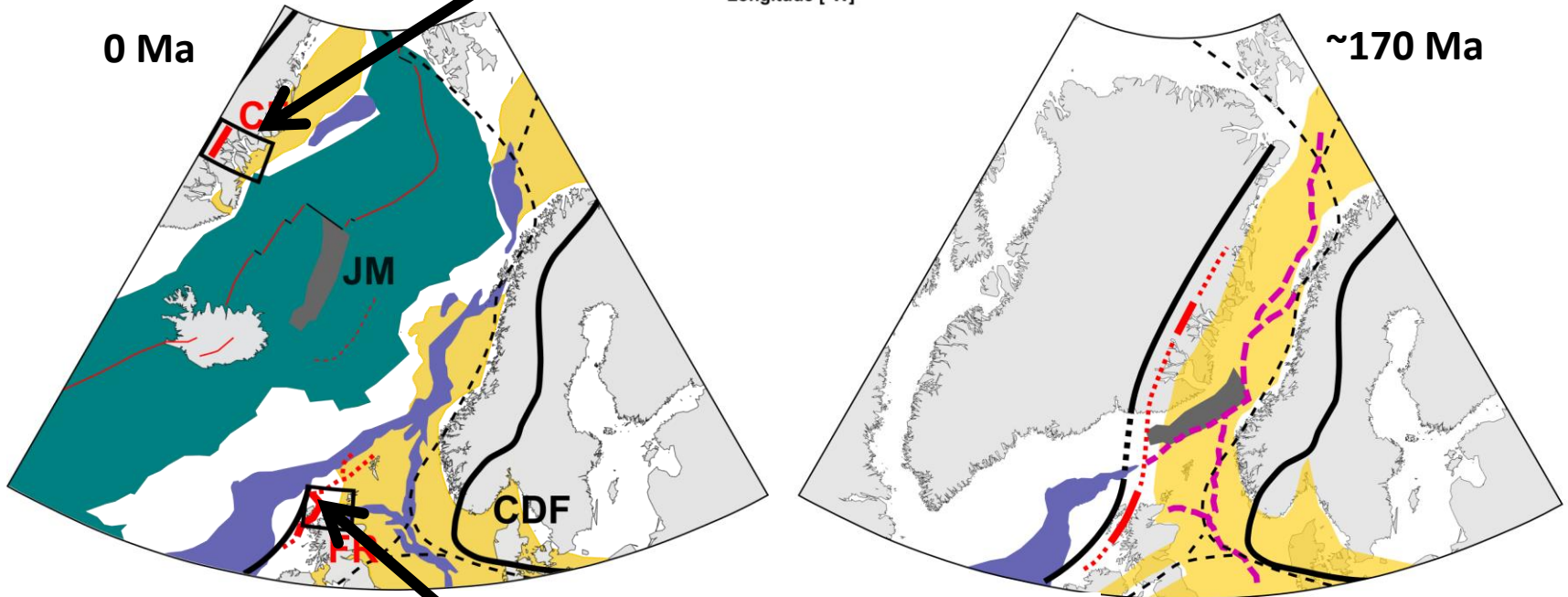
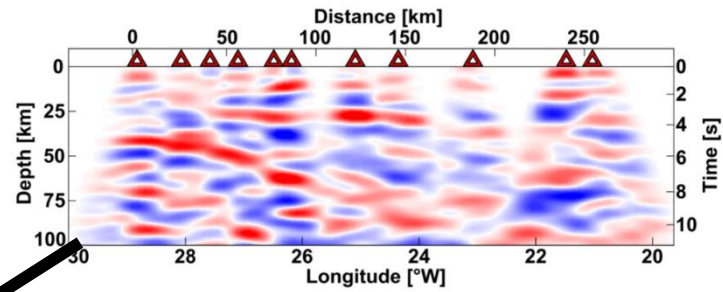
East Greenland



East Greenland



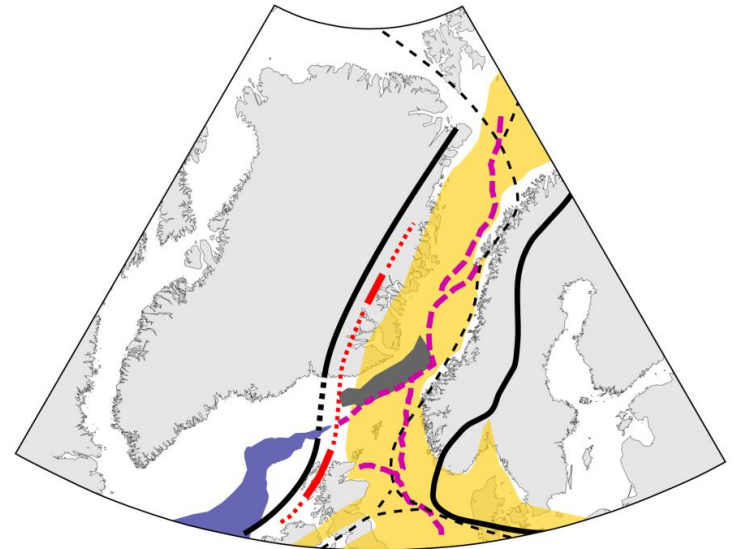
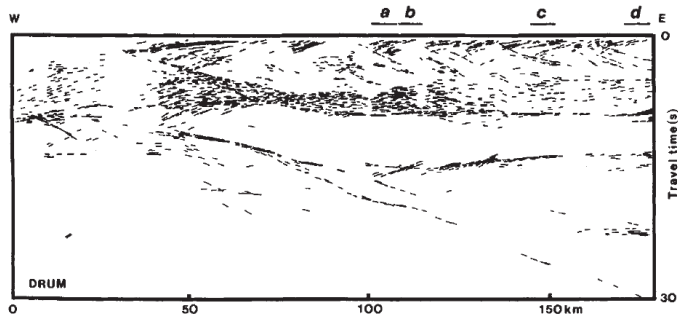
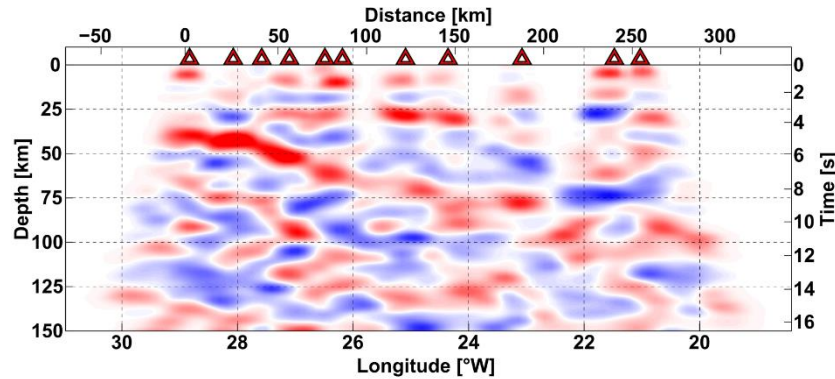
Reconstructions



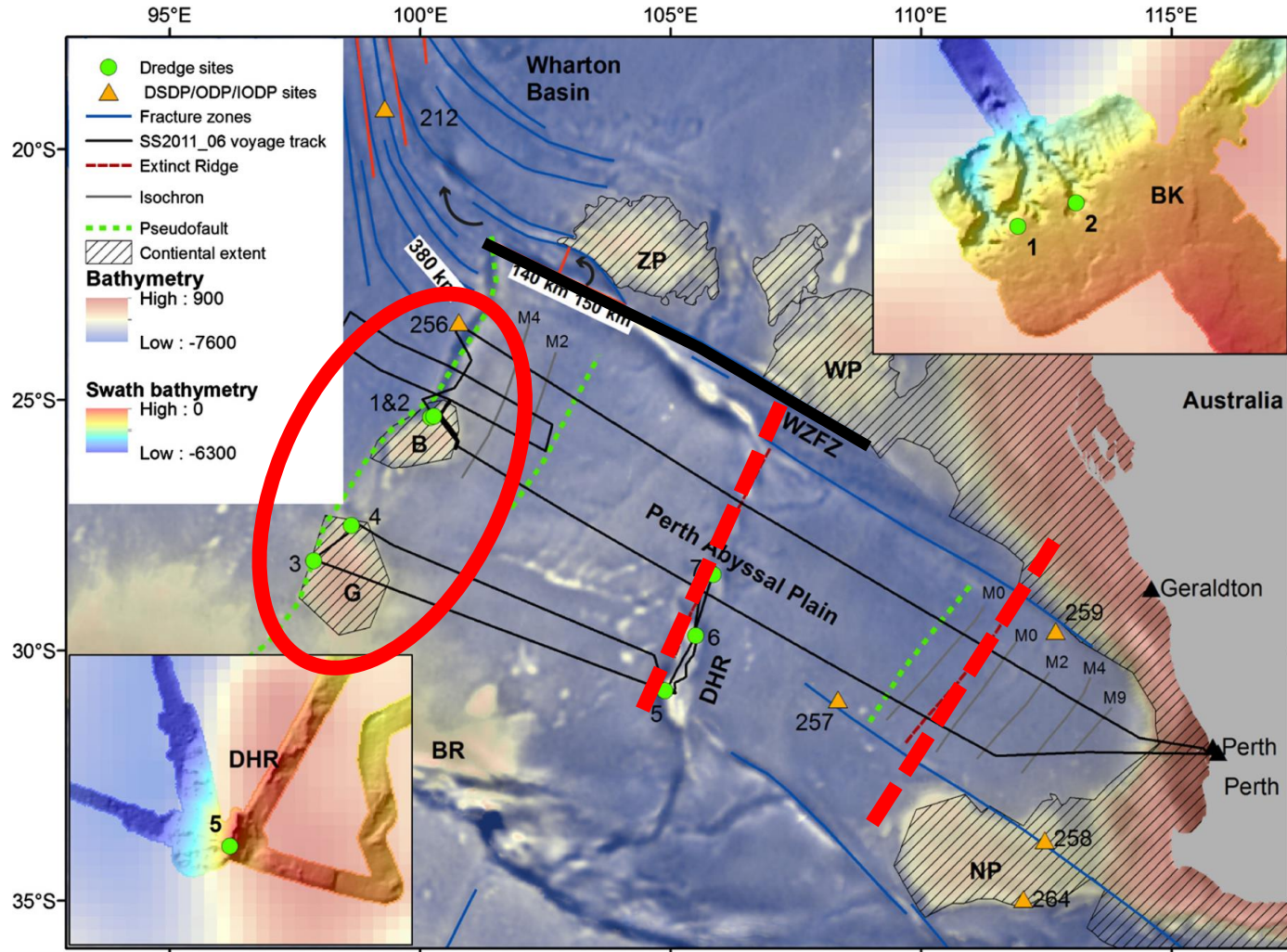
Schiffer et al. (2015)

East Greenland

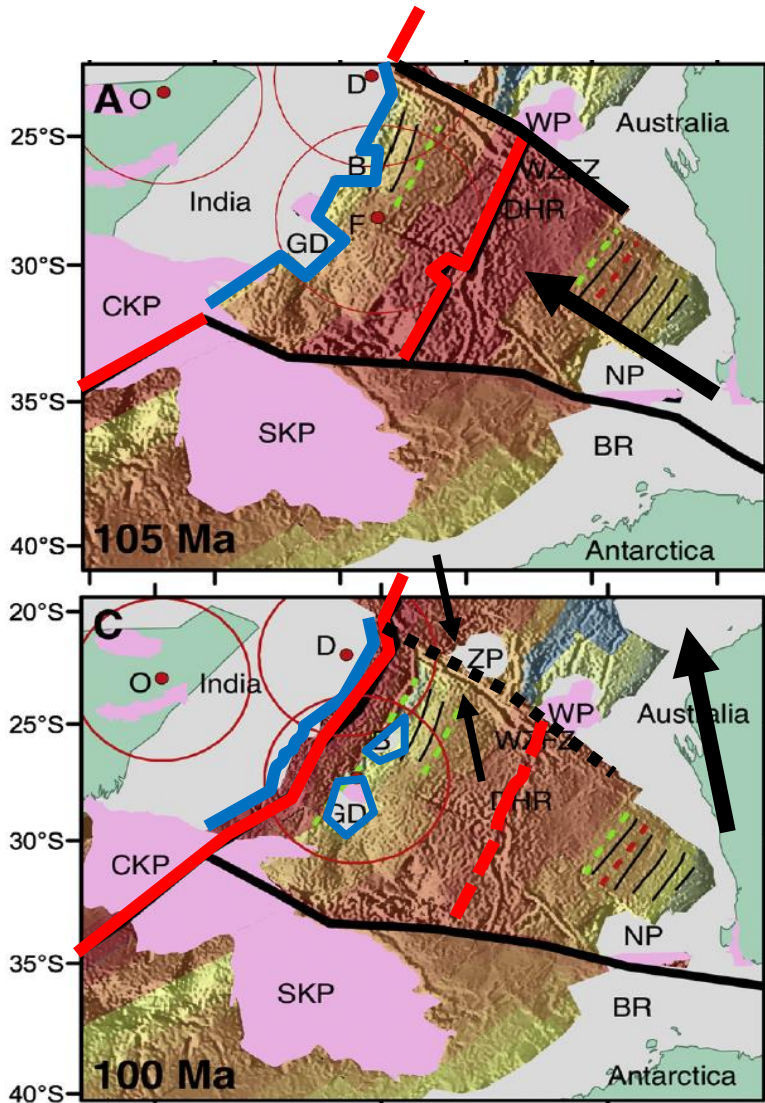
- “Mantle scar”, fossil suture/subduction/underthrusting
- Structural and compositional weakness
- Caledonian age, or older?



Microcontinent formation Eastern Indian Ocean

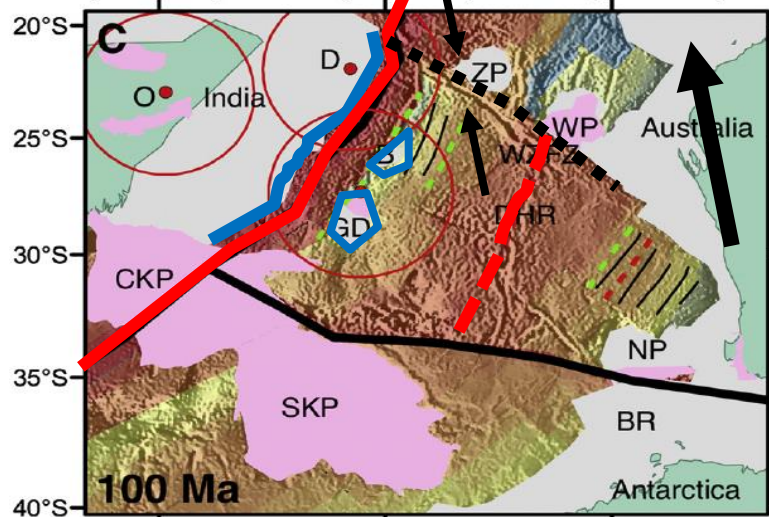
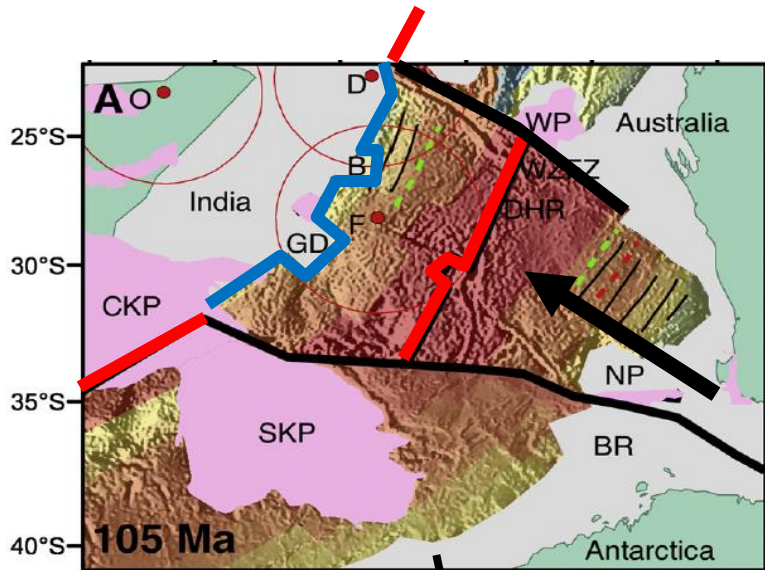


Microcontinent Formation

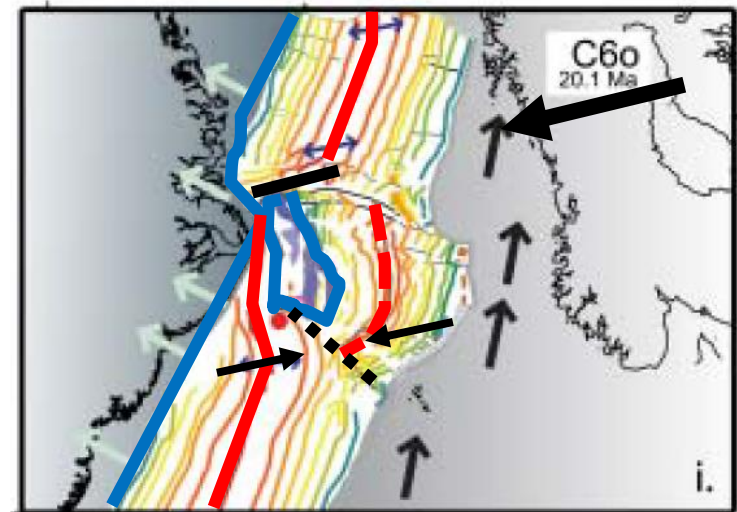
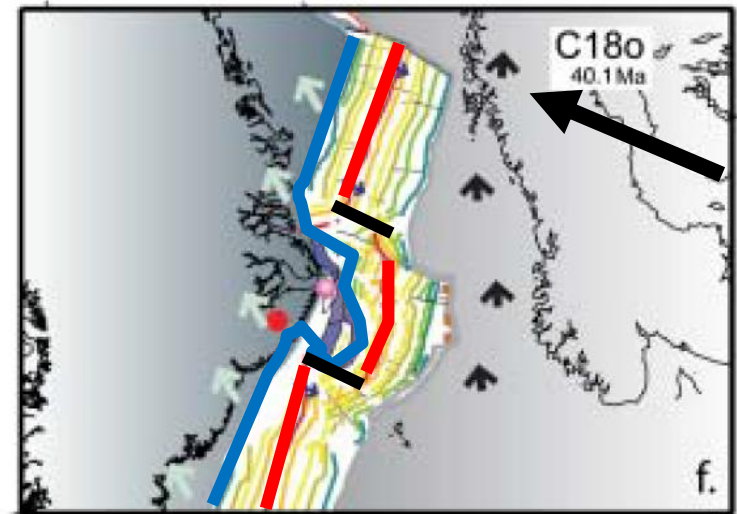


Whittaker et al. (2016)

Microcontinent Formation



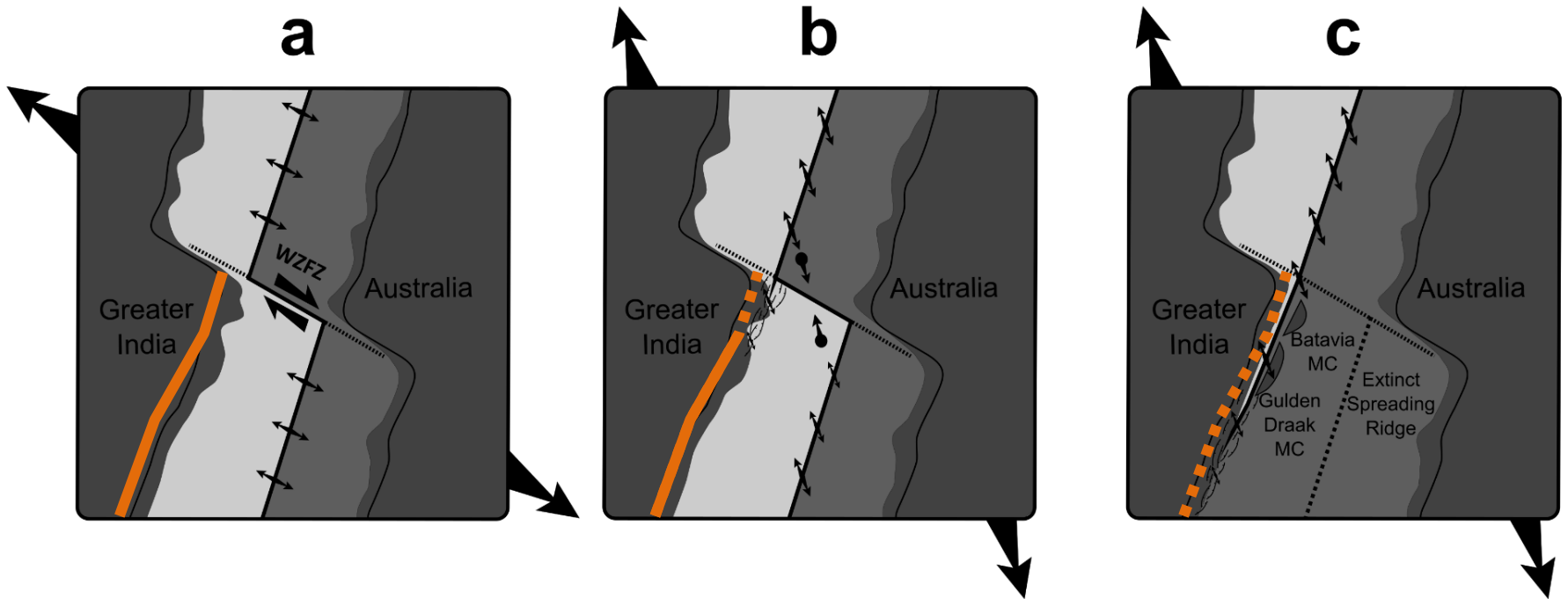
Whittaker et al. (2016)



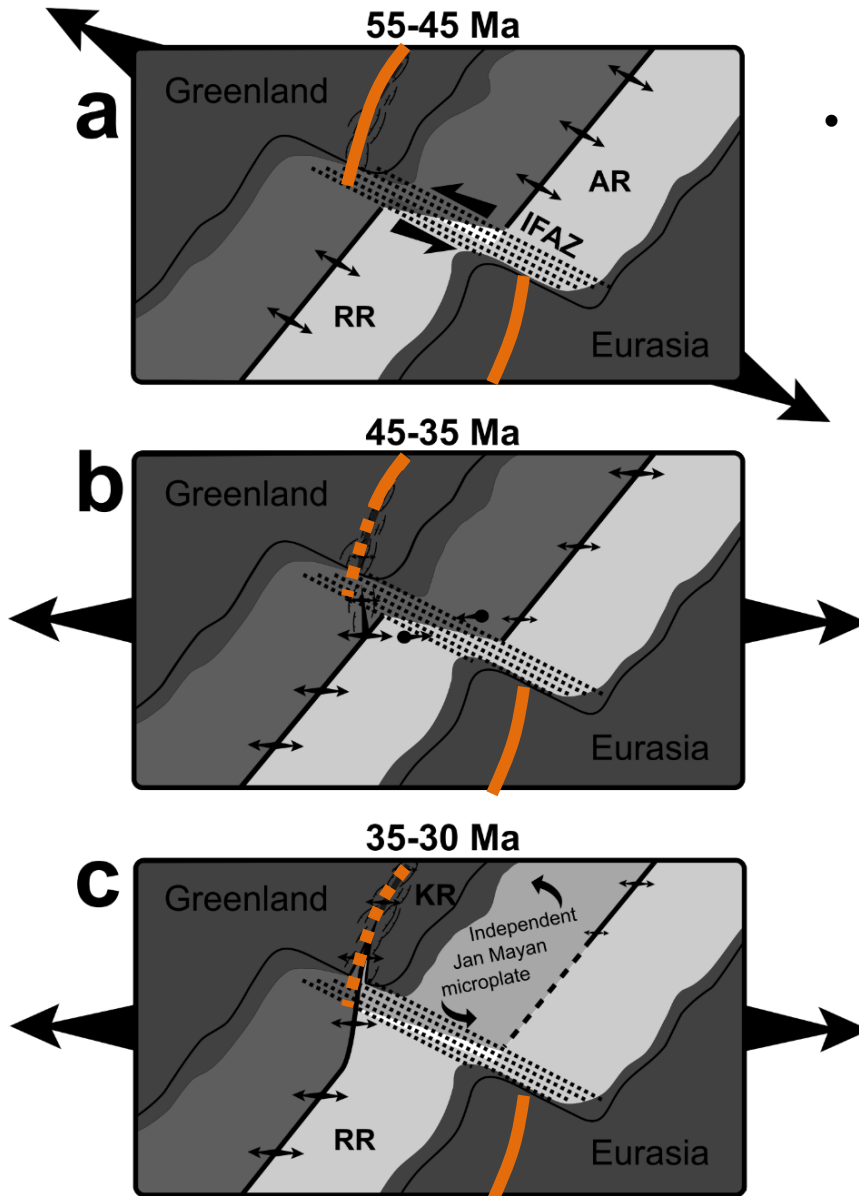
Gaina et al. (2009)

Microcontinent Formation

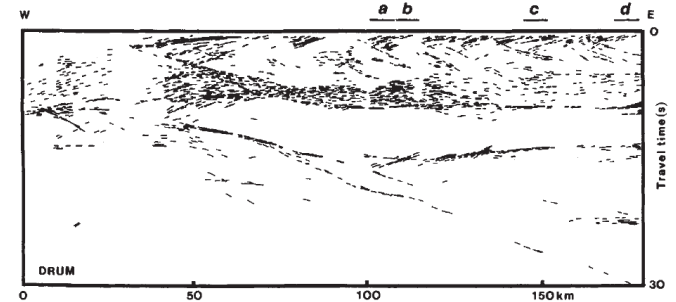
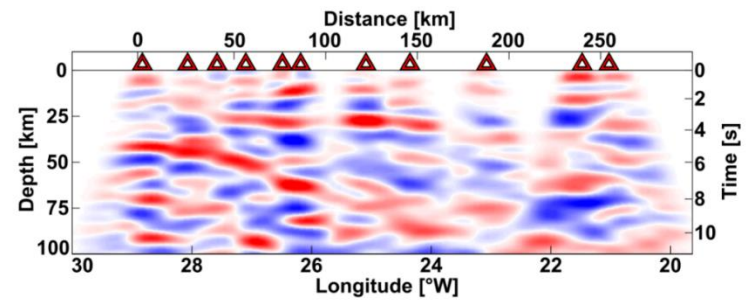
- Thermally weakened lithosphere



Formation of the Jan Mayen Microplate

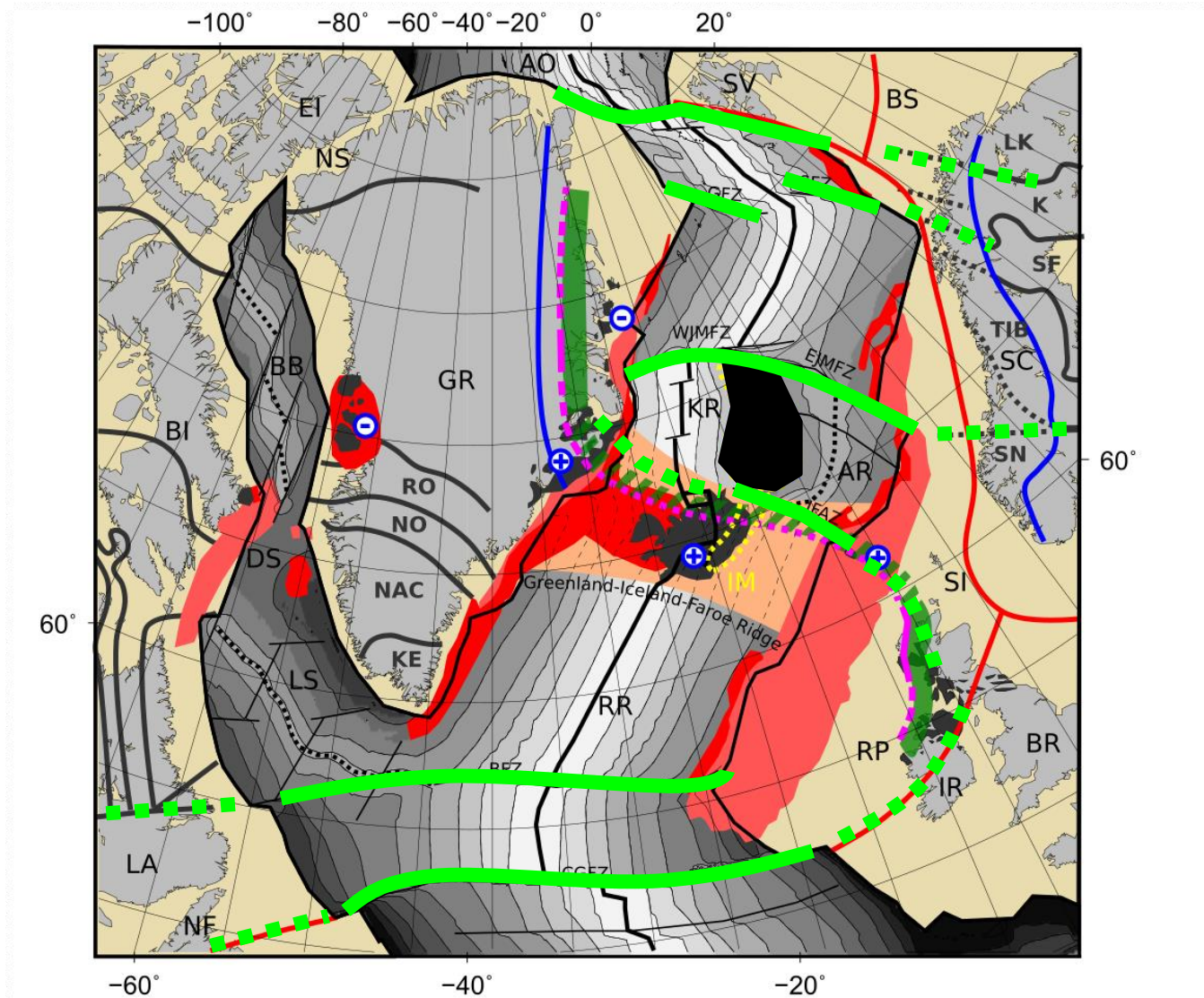


- Structural weakness (“mantle scar”)



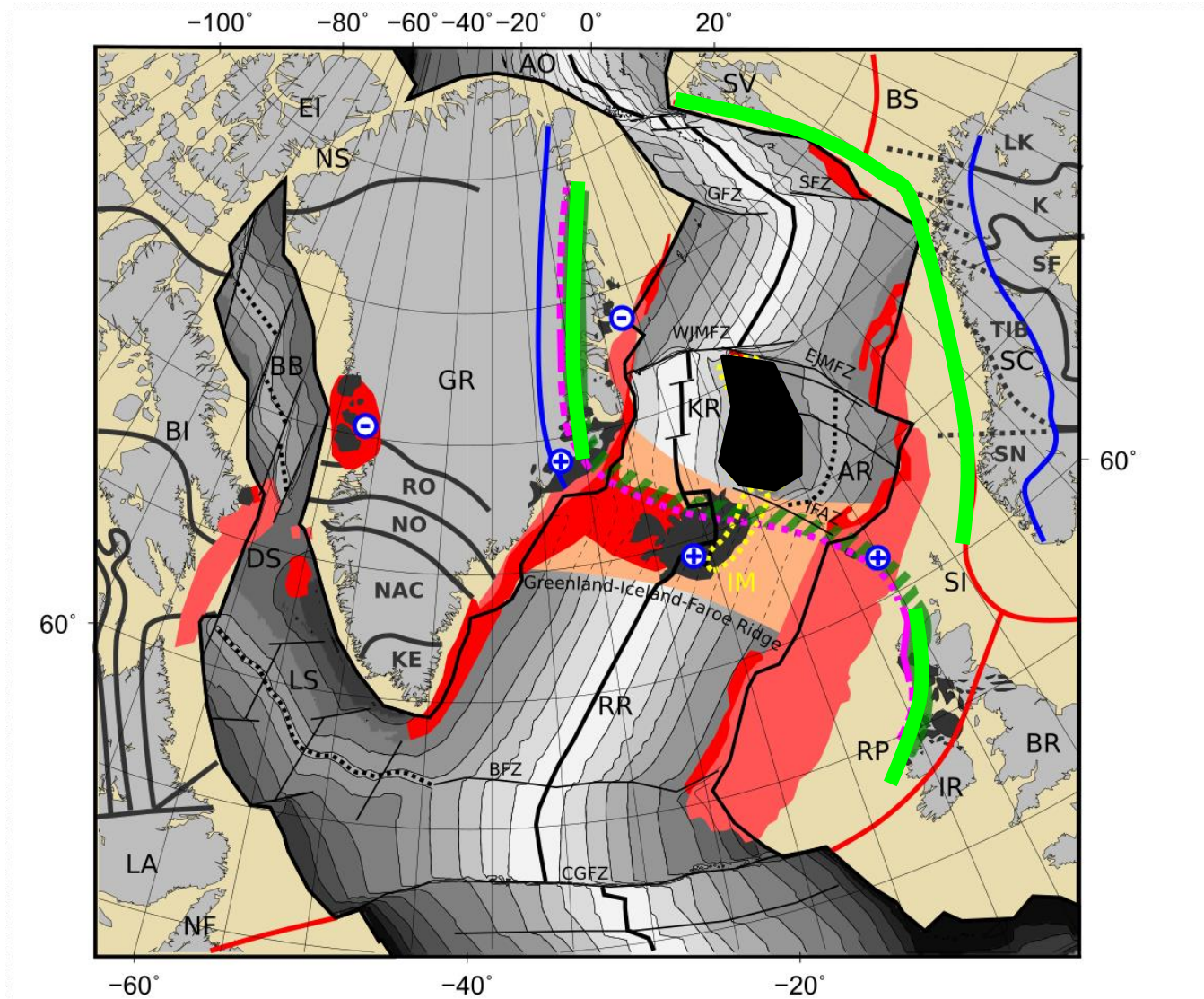
Summary

- Fracture zones (and other deformation zones) -> N-S extent



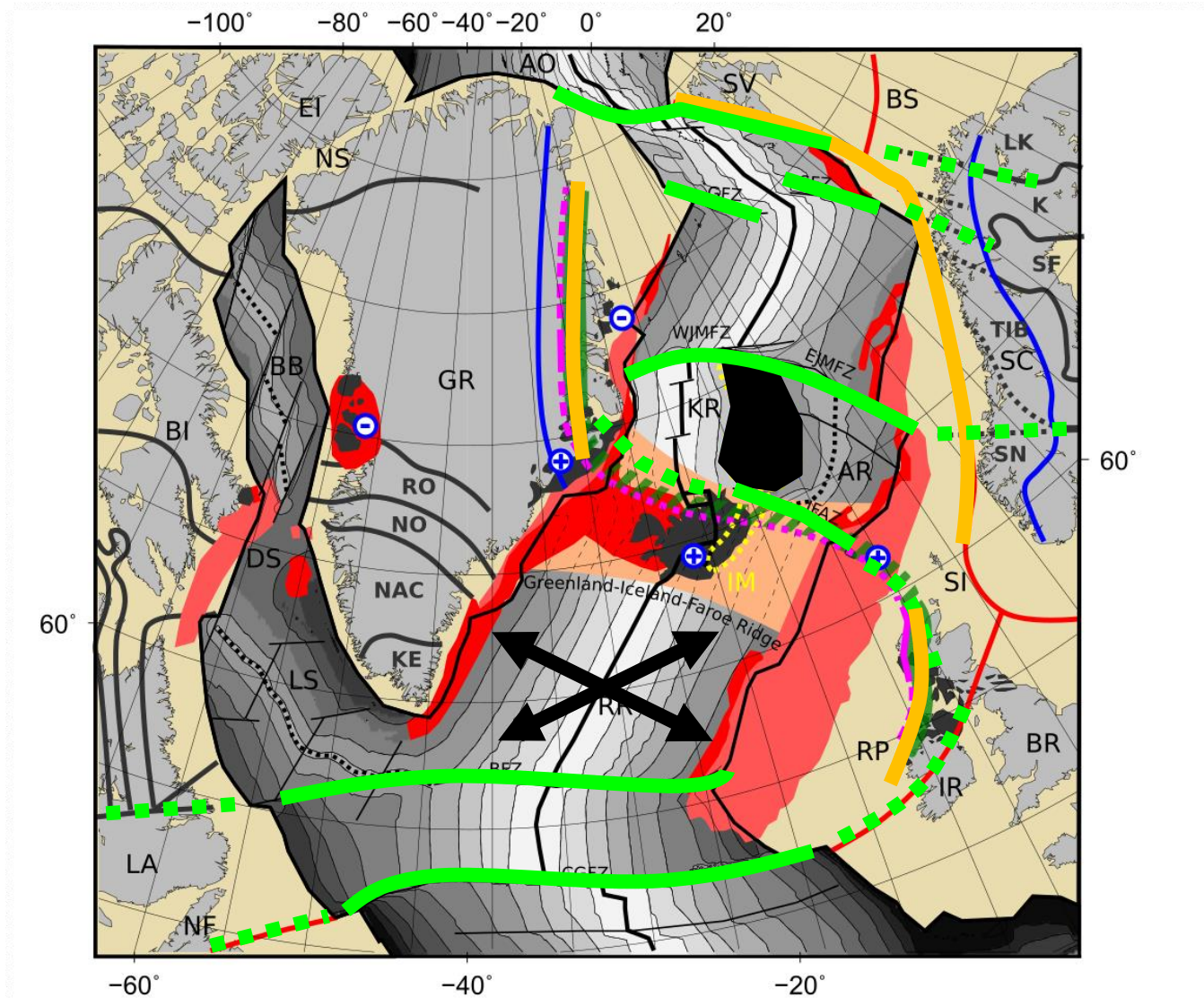
Summary

- Caledonian structures -> E-W extent



Summary

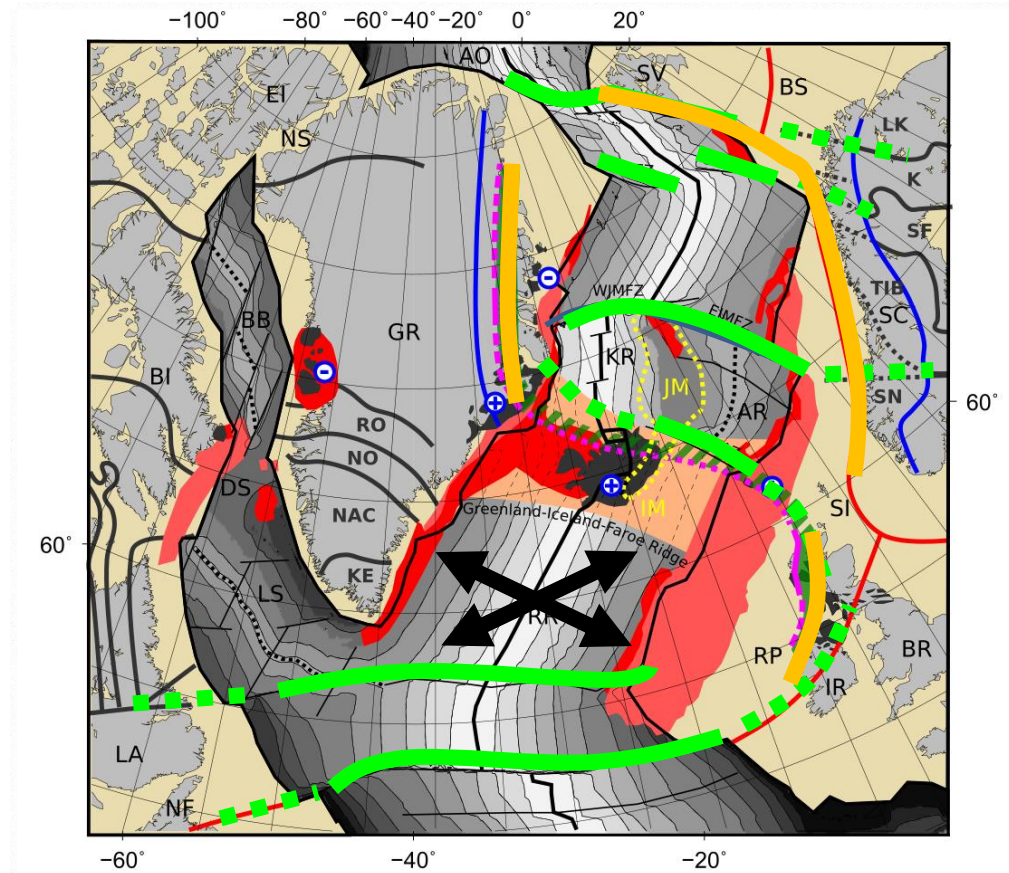
- Fracture zones, Caledonian structure, plate motion/seafloor spreading



Key questions/tests

1. Numerical modelling

- Test rejuvenation of inherited structures and extension in different angles
- 3D problem!!!



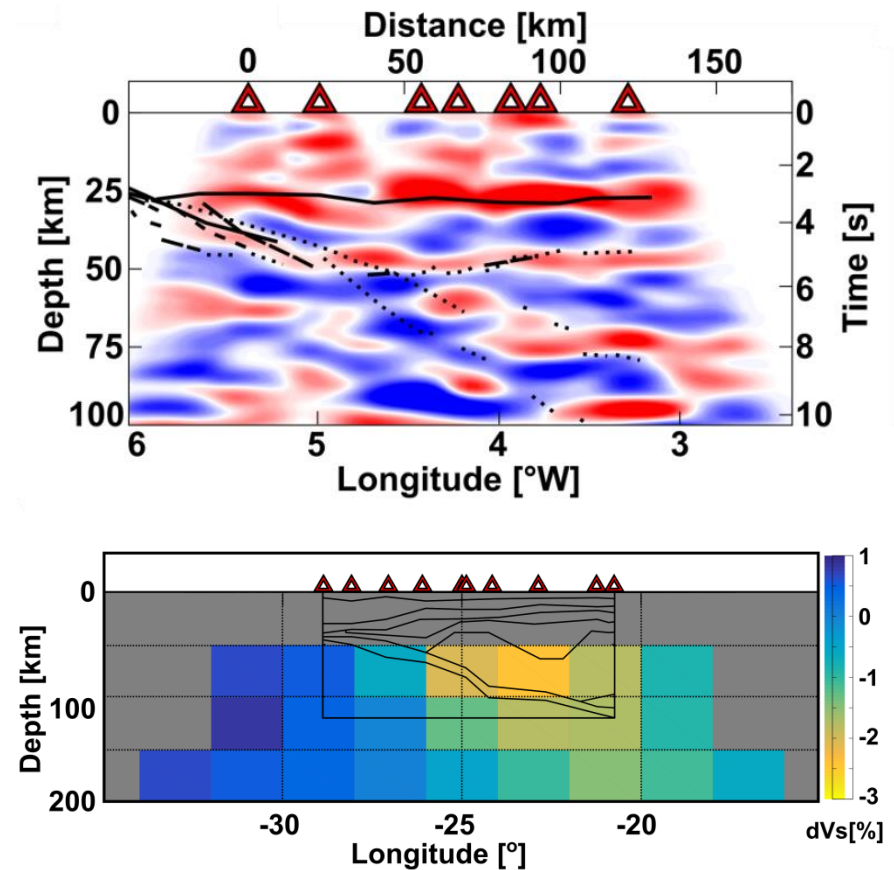
Key questions/tests

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2. Understanding of structural relations from the surface to the mantle and the vertical propagation of processes

- More integrated studies in key areas



Key questions/tests

1. Numerical modelling

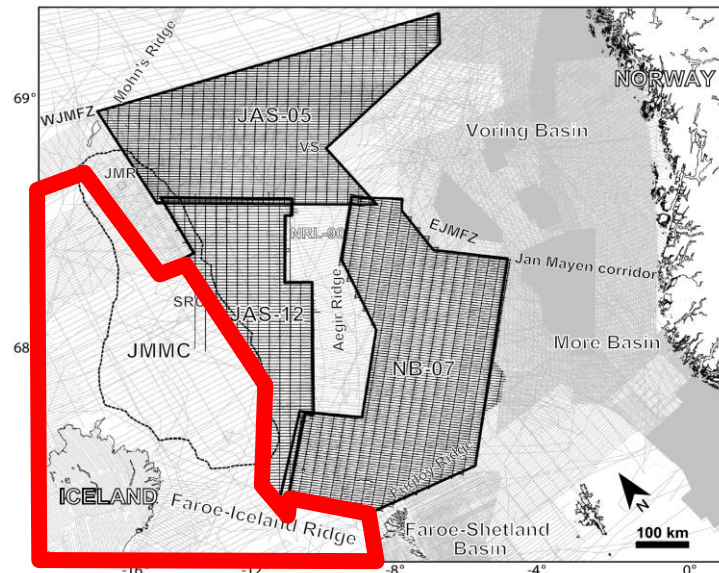
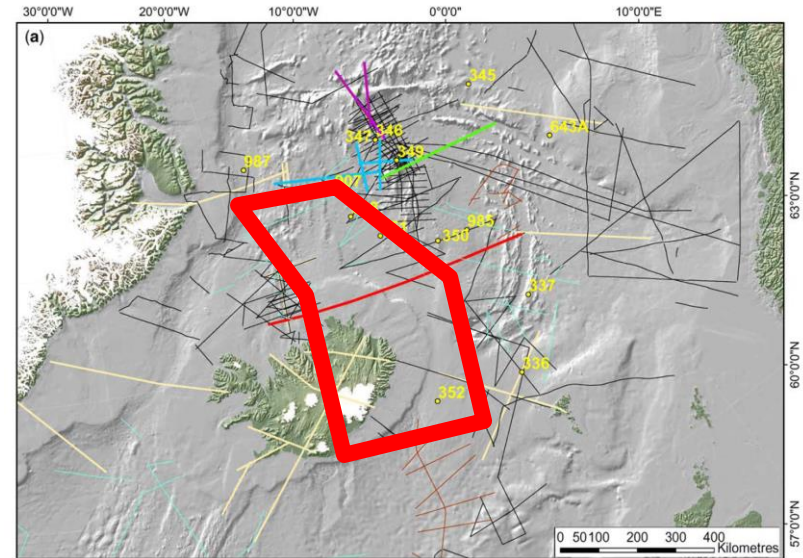
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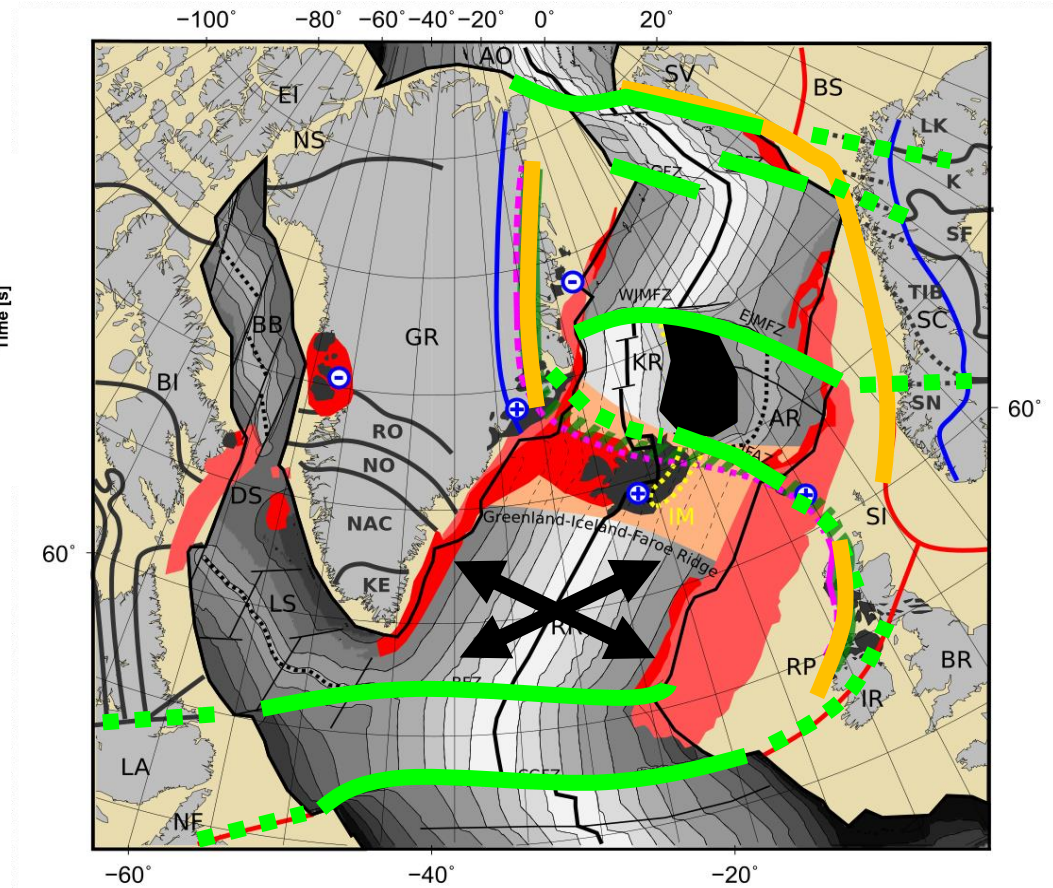
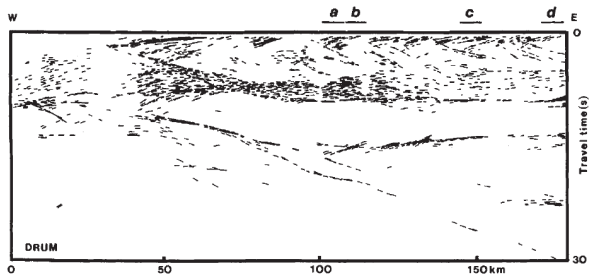
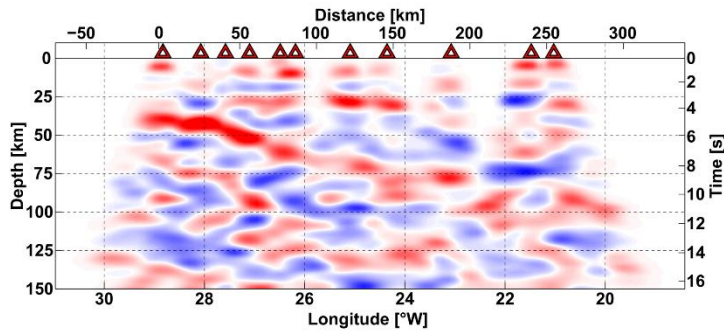
- More integrated studies in key areas

3. Understanding crustal affinity and spreading history

- More data in underrepresented areas



Thank you for your attention!



Formation of Jan Mayen Microplate

